Minnesota Plant Press

Vol. 12:1 Newsletter Of The Minnesota Native Plant Society, Fall 1992

Upcoming Monthly Meetings

Nov. 4 - Bob Jacobson, MN Dept. of Transportation. The Corridor Concept: Linking Natural Areas with Highway Corridors Containing Native Species.

Dec. 2 - David French, Dept. of Plant Pathology, U. of M. Ash Yellows, Oak Wilt and Dutch Elm Disease

Jan. 6 - Speaker To Be Announced.

Feb. 3 - Mark McKone, Carleton College, Northfield Ecological Restoration in the Carleton Arboretum.

Mar. 3 - Anita Cholewa, Dept. of Plant Biology, U. of M. Common Plant Families of Minnesota and How to Know Them.

President's Report Fall, 1992

Don Knutson

Hello, everyone! Welcome back to autumn and the Minnesota Native Plant Society. Our native plants had a most unusual summer. I read that no summer in Minnesota has been this cool since 1915. Native plants seemed to thrive in the cool, wet weather: leaves were bigger and more numerous, flowers were very abundant and plant stature was greater than usual.

We are all looking forward to fall, winter and spring season of our monthly get-togethers, speakers, plant-of-the-month programs, fall seed exchange, spring plant sale, our newsletter, The Plant Press and of course, the Spring Symposium.

The Board of Directors will continue to emphasize the the education of ourselves and others as the primary goal of the Minnesota Native Plant Society. We will work hard to strengthen our committees, viewing them as the principle means of meeting our objectives. We want to broaden and strengthen the newsletter and improve communication among members.

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Announcements

• The Minnesota Plant Press may be obtained through membership in the Minnesota Native Plant Society. The newsletter is distributed three times a year (fall, winter and spring). Items of interest for the newsletter will be welcomed. Please submit typed, double spaced copy: submissions via computer disk are welcomed, but please include a hard copy and identify word processing program.

• **Membership Information and Registration** - Last call for 1992 dues. This is the last newsletter for lapsed memberships; check your mailing label for membership status. If you have moved recently, please let us know as soon as possible so we can update our records. Our newsletter is sent by bulk mail, which is not forwarded. To renew your membership please fill out form on page 10 and mail to:

Minnesota Native Plant Society
220 Biological Sciences Center
1440 Gortner Ave
St. Paul, MN 55108.

• **MNPS Volunteers Needed** - Volunteers are needed to serve on various committees within our organization. If you are interested in helping with any of the following committees, please call the appropriate committee chair person.

PROGRAM COMMITTEE - The program committee functions in three areas, as outlined below. Each of these areas requires a coordinator who is a committee member, as well as volunteers who may or may not be committee members. The three subcommittees can operate almost independently of one another, reporting to the board through the coordinators or through the Program Committee board liason. The Native Plant Society vice-president acts as the board liason for this committee.

A. Monthly Programs. The coordinator of this area recruits and schedules program speakers and Plant of the Month presenters. This includes contacting speakers, making sure that they have the information and equipment necessary for their presentations, and arranging for a one-year complimentary Plant Society membership for program speakers. Additional volunteers are needed to take care of audio-visual needs at the monthly meetings. Currently coordinated (1991-93) by Char Bezanson.

B. Field Trips. The coordinator of this area plans field trips and recruits field trip leaders, arranging for publicity through the newsletter and providing a mechanism for signing up for trips. Field trips are sometimes cosponsored with the Nature Conservancy or other organizations. No current coordinator; done by an ad-hoc group of board members in 1991-92.

C. Symposium. The coordinator of this area works with the board to plan the society's annual spring symposium, arranging the program as well as the physical accomodations. This annual event attracts many non-members, and is an important outreach function of the Plant Society. Many additional volunteers are also needed for this event, and are recruited by the symposium

coordinator. The 1992 symposium was coordinated by Esther McLaughlin. Contact person is Char Bezanson, work:

PUBLICATION COMMITTEE - Responsible for publishing and soliciting articles for the newsletter, printing brochures, posters, etc. Keeping a roster of members with addresses and phone numbers. Also for sending out written materials in response to public requests for information about native plants. Contact person is Roy Robison, work:

EDUCATION & OUTREACH COMMITTEE - Responsible for new memberships, answering inquires about memberships. Promoting new member involvement in Society affairs and providing activities and outreach to schools. Contact person is Diane-Peck Hilscher, home:

CONSERVATION COMMITTEE - Responsible for representing our point of view to duly elected officials of government, for lobbying legislators, for liaison with other conservation groups. Contact person is Bonnie Harper Lore, home:

• **Eloise Butler's Birthday Party** - On August 2, the Native Plant Society was represented at a delightful birthday party. An exceptional summer's day in the Eloise Butler Wildflower Garden served as the backdrop. Free birthday cake and beverages added to the party feeling. At any given time, 100+ cars with families were on hand.

They were rewarded not only with birthday cake, but music which flowed through the garden via guitar on the path and harp from the "Wildflower Station" or Martha Crone Shelter. Party goers were also entertained with readings from "The Wild Gardner" by the author Martha Hellander. Adding to teh fun of the occasion was the selling of the recently released wildflower series by the U.S. Postal Service who set up the "Wildflower Station" for the afternoon. The stamps, cachets, and postcards were appropriate souvenirs of the celebration!

It was my privilege to care for the Native Plant Society table, hand out brochures, and explain our organization. Most attendees were not familiar with the Native Plant Society. Because most of the birthday goers share obvious common interests, some could become new members (I should have emphasized that our meetings provide free cookies and beverages and a party feeling too!).

• **National Wildflower Research Center Midwest Office Closing** - Two years ago the Native Plant Society welcomed the opening of the National Wildflower Research Center (NWRC). The Midwest office was closed July 8.

Closing occured as a direct result of the sluggish economy. Grants from foundations and others were impossible to secure to replace the original state funding. Our matching support from the NWRC national office was withdrawn because of the same problem in national fund raising efforts. The Austin TX office has experienced layoffs and attrition of about half of their staff as well. Their official position is that they will reopen the Midwest Regional office when they can afford to. In the meantime, our office supplies, McIntosh, files and books remain in storage.

Thank you for the support of the Native Plant Society and that of so many of you individually. Our time was short, but we believe we were of use to many as a clearinghouse of information regarding the use and preservation of native plants.

• **Native Seed Producers Association Forms** - The Minnesota Native Wildflower/Grass Producers Association was officially formed this spring. The mission of the association is to promote the responsible use of high quality, regionally adapted native plants and seeds. The members support the preservation of endangered native plant communities and, therefore: will not sell plants taken from the wild; will give preference to local genotypes. If you are interested in receiving a listing of the members and products/services they offer, contact:

Minnesota Native Wildflower/Grass Producers Association
Rt 3, Box 163
Winona, MN 55987

Other Society Notes

• Just a reminder that we still have for sale ($2.50) the 34 page booklet entitled, "Minnesota Native Plant Society Guide to Spring Wildflower Areas in the Twin Cities Region." Just send a check to the Society Headquarters and we'll fire a copy out to you.

• We receivedthe following letter from Nelson T. French, State Director, The Nature Conservancy.

"I was delighted to learn of your $100.00 gift for Prairie Day 1992. Your support is truly appreciated and will make a valuable contribution to this very special project.
On behalf of the Board of Trustees of the Minnesota Chapter and the entire staff of The Nature Conservancy, thank you again for your special gift."

Thanks to the entire membership for making this donation possible. We also had a Prairie Day booth at the National Wildlife Headquarter at the invitation of Ed Moyer. Thanks, Ed, for the opportunity.

• We've been asked to announce a two week travel seminar to Nicaragua and El Salvador with special focus on the environment and the economy. This takes place 25 Jan - 5 Feb 1992. The cost is $1,680.00 from Houston, Texas. For more information, please call (612-330-1159) or write Ms. Ximena N. Scherz, Center for Global Education, Augsburg College, 731, 21st Avenue So., Minneapolis, MN 55454.

Summary of the Spring 1992 Meeting

The Plant-of-the-Month: Bloodroot (*Sanguinaria canadensis*), was presented by Char A. Bezanson. The name of this plant comes from the Latin sanguis (blood). It is also called red puccoon; puccoon is a Native American term for plants used for dyeing cloth. Bloodroot is in the Poppy family, Papaveraceae. It is the only member of this family native to Minnesota.

Bloodroot is found in Eastern North America, from Canada in the north to Texas and Florida in the south. It is found throughout Minnesota, most commonly in the deciduous forests of the southeastern part of the state. Bloodroot grows in full sun to partial shade. It prefers the rich, humus soil of cool moist deciduous woods and woodland slopes. Cultivation is not difficult where these conditions can be approximated. Propagation is by seed, or by rhizome division in autumn. Bloodroot is hardy to USDA Zone 3.

An herbaceous perennial, bloodroot spreads from a thick horizontal rhizome. It has a single palmately veined leaf, and a single flower consisting of 2 sepals, 8-12 white petals, and 24 stamens. The rhizome, petiole of leaf and flower stalk all exude the red sap from which the plant takes its name. Flowering occurs in late March to early May. The leaf wraps around flower until pollination, possibly providing protection from the cold. The fruit is an ellipsoid capsule. The leaf continues to grow until midsummer, reaching 2-4 dm and overtopping the mature capsule.

Bloodroot was used by Native Americans as a fabric dye, a body stain, and medicinally. The body stain was intended to frighten away enemies. After the advent of European colonization, Native American women forced to spend the night with Captain John Smith reportedly painted their bodies with bloodroot. The efficacy of this strategy has not been documented.

As a fabric dye for silk and wool, bloodroot produces a number of different colors. If used without a mordant, it produces an orange color. When a mordant of alum is used, the color obtained is rust, and with a mordant of tin, pink.

The medicinal uses of bloodroot are also quite varied. The plant contains the alkaloid sanguinarine. which is known to be pharmaceutically active. Lake Superior Indian tribes used the juice to treat skin cancers. (treatment of breast cancer also mentioned). A tea from the leaves was used to treat sore throats, as was a drop of sap on a lump of sugar. Some tribes chewed the root and spat the juice on burns; another source lists nausea, vomiting, headaches, and tunnel vision as possible side effects of ingestion. Other listed uses include use for rattlesnake bites, as an insect repellant, and treatment for sick mules.

References: 1) Gray's Manual of Botany, 8th Ed, Fernald, 1970; 2) Wildflower Folklore, Laura C. Martin; 3) Rodale Encyclopedia of Herbs, 1987; 4) Vascular Plants of Minnesota, Morley and Ownbey.

The May 1992 speaker was Dr. Larry Inman, discussing the American chestnut and the chestnut blight. This fungal disease was first observed in the New York Zoological Park in 1904. The chestnut blight, a native of Asia, spread very rapidly throughout the range of the American chestnut, especially the Northeast. As with most introduced diseases, there was no natural resistance in the American chestnut and the species was completely eliminated as a component of eastern forests.

Americans lost one of the most versatile trees. The chestnut tree was used for high grade lumber, poles, railroad ties, slack cooperage (for barrels) and paper-making. It was prized as a shade tree, and, of course, the nuts were roasted for food.

Dr. Inman insists that is not necessary to allow such diseases to decimate our tree species--that breeding programs can introduce resistance from trees growing in the areas where the disease organism in native. What is needed is the appropriate methodology; especially important is the use of the backcross for quick determination of resistance to the disease. A backcross is the cross of a hybrid to one of the parental types. It is used to determine the genotyype of individuals that may carry recessive alleles which would otherwise be obscured by dominant alleles. In many plants, resistance is a recessive trait. In addition, a graft-compatible, dwarfing chestnut hybrid rootstock is available. Seedlings grafted on it grow like bushes, produce flowers with pollen the second year after the graft and produces nuts the third year. This reduces the time required for successive generations of backcross breeding, allowing rapid screening for trees resistant to the disease, while maintaining trees with the other desirable traits of the recurrent parent trees.

Dr. Inman was a student of Dr. C.R. Burnham, one of the founders of the American Chestnut Foundation. Dr. Burnham was unable to give this talk due to illness.

Native Plant Society Speaker List

Ruth Phipps has developed a 10 year list of the program lectures for the Minnesota Native Plant Society. As part of our 10th anniversary celebration, we list them for your enjoyment. It is a very impressive catalogue, don't you agree?

Feb 1982 Introduction to the wildflowers of Minnesota. Ms. Evelyn Moyle, co-author of Northland Wildflowers.

Mar 82 Natural history of the maple-basswood forest in Minnesota. Dr. Edward Cushing, Prof. Ecol. U. of Minn.

Apr 82 The prairie and it's weeds--A human perspective. Ann Sigford and David Johnson, Wood Lake Nature Center.

May 82 The Herbarium--what it means to you (includes a tour). Dr. Gerald Ownbey, Prof. Bot. U. of Minn.

Jun 82 Slides and tour of St. Paul Campus flower and prairie garden. Dr. Robert Mullin, Prof. Hort. U. of Minn.

Oct 82 Restoration and Management of the U. of Wisc. Arboretum. William. Jordan III, U. of Wisc.

Nov 82 Minnesota mushrooms. Dr. David McLaughlin. Prof. Bot. U. of Minn.

Dec 82 Vegetational patterns in Minnesota peatlands. Dr. Herbert Wright, Dir. Limnol. Res. Ctr. U. of Minn.

Jan 83 Vegetational development in SE Alaska following glacial recession, as a key to understanding post-glacial vegetation in Minnesota. Dr. Don Lawrence. Prof. emer. Bot. U. of Minn.

Feb 83 Tour of Biological Sciences Greenhouse, U. of Minn. Roberta Sladky, Manager(postponed due to weather).

Mar 83 Butterflies and plant interactions. Robert Dana, Grad. stud.

Apr 83 Conservation of flora in Great Britain. David Jordahl.

May 83 Wetland plants and plant communities. Steve Eggers, Bot. Army Corp. of Engineers.

Jun 83 The fun of wild plants and wild plant lore. Marv Borell.

Oct 83 Tour (from Feb 83).

Nov 83 Winning slides from the Minn. Botany International Exhibition.

Dec 83 Rare plants of Minnesota. Welby Smith.

Jan 84 Do plants benefit from the animals who eat them? Tabor Allison.

Feb 84 The vegetation patterns and history of Minnesota Jack pine forests. John Almendinger.

Mar 84 What is an individual plant? Mark McKone.

Apr 84 The flora and vegetation of Minnesota peatland. Norman Aasing.

May 84 The flora and vegetation of old growth northern hardwood forests in Minnesota. Barbara Coffin.

Oct 84 Seed exchange.

Nov 84 Fern workshop. Harriet Mason

Dec 84 Minnesota mosses. Jan Janssen

Jan 85 Minnesota's Scientific and Natural Areas program. Bob Djupstrom.

Feb 85 Costa Rican National Parks. Peg Kohring.

Mar 85 Minnesota Ginseng. Welby Smith.

Apr 85 ?

May 85 Root & seedling exchange and field trip slides.

Oct 85	Seed exchange.
Nov 85	Third annual Minnesota Botany Photographic Salon. Ken Olson.
Dec 85	Fires in coniferous forests. Sandy Bartell Hansen.
Jan 86	Wetland plants and plant communities in Minnesota and Wisconsin. Steve Eggers.
Feb 86	Natural history and management of Crex Meadows, Wisc. Jim Hoefler.
Mar 86	Insect pollination of forest wildflowers. Rich Hansen.
Apr 86	Distribution of plants in Minnesota. Prof. Gerald Ownbey, Prof. of Bot. U. of Minn.
May 86	Seedling exchange and field trip slides.
Oct 86	Prairie burning. Peg Kohring. Seed exchange.
Nov 86	Minnesota Botany Photography Exhibition.
Dec 86	?
Jan 87	?
Feb 87	Fire and vegetation in S. Minnesota before settlement by Europeans. Eric Grimm.
Mar 87	Establishing a prairie and a spring woods garden. Robert Mullin.
Apr 87	Impact of acid rain in ecotypes in Minnesota. Ron Lorenz.
May 87	Plant sale. Slides of field trips.
Oct 87	Prairie restoration. Ron Bowen. Seed exchange.
Nov 87	Minnesota Botany International Exhibition of Photography.
Dec 87	Lichens of Minnesota. Clifford Wetmore.
Jan 88	Voyageurs Nat'l Park: The boreal forest. Nancy Albrecht.
Feb 88	Mushrooms of Minnesota. Dr. Dave McLaughlin. Prof. of Bot. U. of Minn.
Mar 88	Prairie grasses of Minnesota. Dr. Anita Cholewa. Prof. of Bot. U. of Minn.
Apr 88	Native plant collection at the U.S. Nat'l Arboretum. Cole Burrell.
May 88	Seedling, plant exchange. Field trip slides.
Oct 88	Soils as a factor affecting plant distribution in Minnesota. Dr. Ed Cushing. Prof. of Ecol. U. of Minn.
Nov 88	(probably the nature photography show).
Dec 88	?
Jan 89	Glacial relict plants. Peg Kohring, Nature Conservancy.
Feb 89	Cultivated native trees and shrubs for the home. Dr. Gerald Ownbey. Prof. of Bot. U. of Minn.
Mar 89	Update on the Minnesota Dwarf Trout Lily. Dr. Tom Morley. Prof of Bot. U.of Minn.
Apr 89	Mosses of Minnesota. Barbara Delaney
May 89	River plants of central Minnesota. Audrey Engels. Plant exchange.
Oct 89	Minnesota rare plants. Welby Smith.
Nov 89	Inventory of Prairie Bush Clover. Nancy Sather.
Dec 89	Natural history of the dwarf mistletoes. Dr. Don Knutson.
Jan 90	Open forum and discussion among members.
Feb 90	Historical aspects of early Minnesota plant collectors. Mike Heinz.
Mar 90	Wilderness values. Dr. Eville Gorham. Prof. of Ecol. U. of Minn.
Apr 90	Botany of South Africa. Peg Kohring.
May 90	Annual Minnesota Botany slide show. Field trip reviews. Plant sale.
Oct 90	?
Nov 90	National Wildflower Research Center. Bonnie Harper-Lore.
Dec 90	Forest intensification. Jan Green.
Jan 91	Questions & answers & open discussion on native plant use and gardening with the experts.

Feb 91	Prairie Bush Clover recovery efforts. Nancy Sather.
Mar 91	Vegetation of Kittson county, Minnesota's northwest frontier. Robert Dana.
Apr 91	Pollination studies of native prairie plants in natural and restored prairies. Dr. Catherine Reed.
May 91	Nature photography show. Field trip reviews. Plant sale.
Oct 91	Seed storage and germination tips. May Wright. Seed exchange.
Nov 91	The dynamic prairie. Disturbance leads to diversity. Prof. Charles Umbamhower.
Dec 91	Conserving grassland and biodiversity. David Wedin.

President's Report continued from pg. 1

We need to define our outreach programs to individuals, schools and other institutions that request information. The conservation committee has asked for more specific guidelines to help them structure their efforts. The membership committee needs goals; how many members do we want?

So, please signal your availability to help. Putting your interests to work will strengthen our Society and help us be a real "force" in our efforts to make everyone aware of Minnesota's native plants.

Ruth Phipps has accepted the position as treasurer. Welcome, Ruth! And thanks, Harriet Mason, for your long duty-tour in the counting house! We hope that, after a reasonable rest for a week or two, you will channel your skills and enthusiasm toward your favorite committee.

We on the Board of Directors need to hear from you--your interests, your concerns, your ideas, your 'druthers, your neighborhood news about plants and how we can help them. Feel free to call me or leave a message. I promise I'll call back.

I hope to see many of you at our monthly meetings on the St. Paul Campus, Univ. of Minnesota!

Don Knutson, President.

MNPS Board of Directors Fall 1992

President:
Don Knutson

Vice President:
Char Bezanson

Secretary:
Pat Ryan

Treasurer:
Ruth Phipps

Newsletter Editor:
Bob Jacobson

Board Members:

Chase Cornelius

Roy Robison

Bonnie Harper-Lore

Rick Jannett

Diane Hilscher

Rebecca Schirber

Minnesota Native Plant Society Membership Registration Form

____ Renewal ____ New Member

Membership categories:

____ Individual - $10.00
____ Student - $8.00
____ Senior - $8.00
____ Family - $12.00
____ Institution - $20.00
____ Donor - $25.00

Name _____ Phone _____

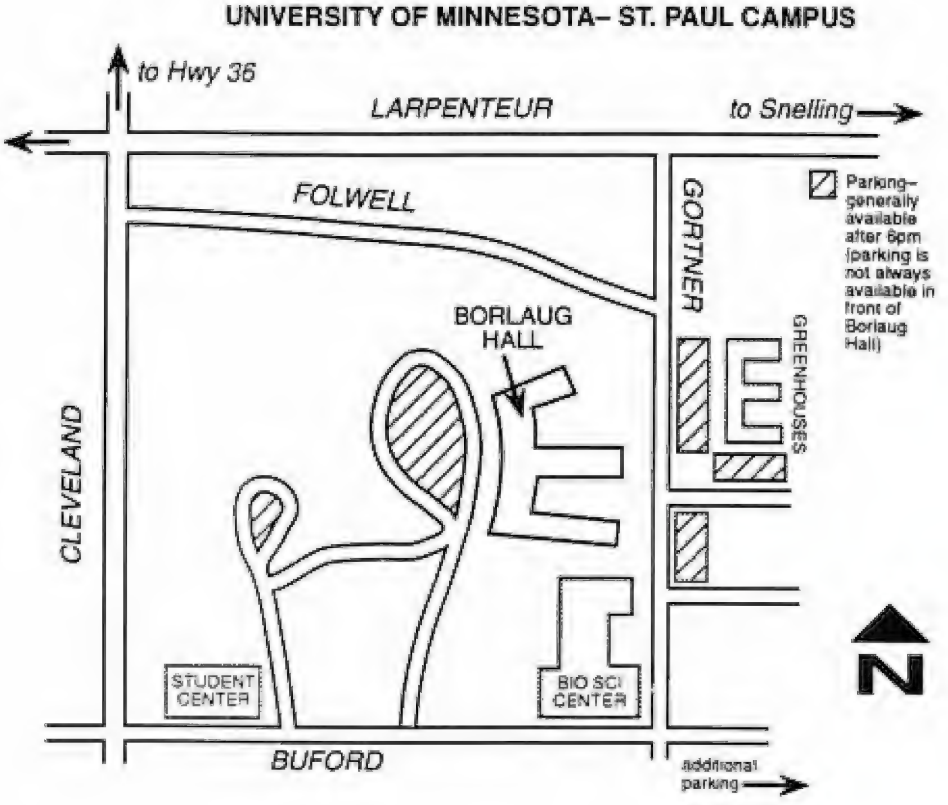
Address _____

City _____ State _____ Zip _____

Checks can be made out to the Minnesota Native Plant Society. Please fill out above form and mail with check to:

Minnesota Native Plant Society
220 Biological Sciences Center
1445 Gortner Ave
St. Paul, MN 55108

Minnesota Native Plant Society



Minnesota Native Plant Society
220 Biological Sciences Center
University of Minnesota
St. Paul, MN 55108

Minnesota Plant Press

Vol. 12:2 Newsletter Of The Minnesota Native Plant Society, Winter 1993

Upcoming Monthly Meetings

The Minnesota Native Plant Society holds monthly meetings from October through May, on the first Wednesday of each month, unless noted through special mailing. Meetings are held in room 335 Borlaug Hall, St. Paul campus U of M. Meeting are 7:30 - 9:00 PM.

Mar. 3 - Anita Cholewa, Dept. of Plant Biology, U. of M. Common Plant Families of Minnesota and How to Know Them.
April 7 - Clarence Lehman. Music of the Leaves.
May 5 - Plant Sale and Photography Show.

Pollination Notes On Minnesota Orchids: The Lady's-slippers

Charles Argue

So different are lady's-slippers from other, more specialized orchids that botanists sometimes place them in a family of their own. They are distinguished by a number of characters, but the most conspicuous difference is the deeply saccate, pouch-like lip of the flower, from which the plants take their name.

This lip plays an important role in pollination. All lady's-slippers have flowers of a type known as trap or semi-trap blossoms. The flowers temporarily imprison their insect pollinators and force them to follow a prescribed sequence of behaviors in order to obtain their release. The insect, usually a bee, enters the lip through the obvious large opening at its top, but the in-rolled edges and slippery inner surface often prevent it from leaving by the same route. There remains but one way out. A foothold is provided by a row of tightly packed, long hairs on the bottom of the lip. These lead along a pathway toward escape holes at the base or heel of the slipper. The escaping bee may also be attracted along this path by colored lines on the lip's inner surface and by light coming from the escape holes or from translucent window-panes in the side of the lip near its base. In its escape the bee must pass two points where the passageway is narrowed. At the first of these it is forced to squeeze under and rub its back against the surface of the stigma. The

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Announcements

• **ANNUAL MEETING BOARD ELECTION** - The Minnesota Native Plant Society will hold an annual meeting and election of Board of Directors at 7:30 PM on March 3, 1993. The Board has nine members and the term of office is three years. Members whose terms expire Sept. 93 are Don Knutson, Pat Ryan and Becky Schirber. Our year begins October 1st.

The Nominations Committee composed of Char Menzel, Pat Ryan, Nancy Sather and David Stevenson has met and recommends the following slate of candidates: Arden Aanestad, Nancy Albrecht and Becky Schirber. Following is some biographical information about the candidates.

ARDEN AANESTAD - Arden's interest in native plants began early in life as he explored the Antelope Hills prairie area of North Dakota. During college at NDSU he taught botany labs and as a graduate student had a job as a range vegetation specialist (he "counted grass"). After working for much of his career in the development of biological chemicals for Dupont he began working in the areas of establishing research grants with Land Grant College and the Hennepin County Parks covering the subjects of wildflowers, mushroom identification and beekeeping among others. The summer finds Arden operating the Crow Wing Bird Banding Station near Emily, MN.

NANCY ALBRECHT - Nancy presently serves as Coordinator of Natural and Cultural Resource Management in the Division of Parks and Recreation for the MnDNR. Her background is in botany; she holds an M.S. in botany with a minor in ecology. Her undergraduate degrees are in botany, zoology and microbiology. Nancy has worked as a botanist for Mn/DOT and as a naturalist in Voyageurs National Park. She has done research on the use of lichens to monitor air quality. A recreational pursuit is gardening with native plants.

BECKY SCHIRBER - Becky has been serving on the Board for a little over a year, and having enjoyed the experience has agreed to run for a full term. She has an M.S. in rehab counselling and works as a volunteer coordinator for a mental health program. Becky has volunteered on a project to remove leafy spurge from two remnant prairies in Bloomington. She has a strong interest in gardening and landscaping with native plants and puts here knowledge of plants to work in the outdoor space around her downtown Minneapolis home.

• **EDUCATIONAL OUTREACH PROJECT** - In an effort to expand our educational work a project has been initiated to set up a speaker's bureau. We would then be able to respond to requests we receive from garden clubs, civic organizations and others who want to learn more about gardening and landscaping with native plants, the use of native plants in wildlife plantings, etc. As the public becomes more aware of the loss of native habitat we have an excellent opportunity to reach a wider audience. In this regard we want to establish a list of members who would be available to serve as speakers, and also develop a slide show (possibly two) with a script. The need then is for slides showing natural areas, native plant gardens, and also individual plants. Help is also needed in the development of scripts. If you have slides to loan, (slides will be copied) or would like in any way to help with the project please contact Pat Ryan at

• **WELCOME LETTER TO NEW MEMBERS** - This letter is being sent to all new MNPS members.

Welcome to the Minnesota Native Plant Society!

Enclosed is a copy of the latest newsletter the Minnesota Plant Press and a reference guide to publications on native plants. Monthly meetings are held on the University of Minnesota St. Paul campus in Borlaug Hall (as shown on the map on the back page of the newsletter) on the first Wednesday, September through May, at 7:30 p.m. Open board meetings are held at 6:00 p.m. that same evening two blocks away in the Student Center. Besides the regular monthly program, there are several special events we enjoy:

Spring Plant Sale - Members share their extra native Minnesota plants, seedlings and divisions, raising money for the society at our May meeting.

Seed Exchange - In October, members trade native plant seed and information about habitat preferences and cultivation.

Plant Photo Show - Award winning photos from an international competition are presented at one of our monthly meetings co-sponsored with the Minnesota Nature Photography Club.

Spring Symposium - A day-long event, we explore some issue relations to native flora in greater depth.

Members may want to join one or more of the following Action Groups. We welcome you to give your input, learning and sharing in the following goals and activities:

The Conservation Committee has three primary areas of potential activity:

1. Members review issues and upcoming legislation, lobbying and forming liaisons with other conservation groups.

2. In the salvage network, members identify sites and work to re-locate native plants from areas of future development.

3. Members join with public and private organizations to manage their natural area preserves.

The Education and Outreach Committee is involved with outreach and publicity through potential avenues including:

- information booth at events state-wide
- educational programs
- distribution of brochures
- general publicity of Society events
- respond to inquires for membership and other information.

The Publications Committee members publish the newsletter and print the brochures. They also develop and send out written materials The Program Committee plans and organizes the monthly programs, symposiums, field trips and special events.

Please note that memberships are due in September. A notice is posted in the fall newsletter. New members joining after April 1st shall be considered paid through September of the following year. The year your membership has been paid through is typed before your name in the membership listing which is included in the newsletter annually as well as on your address label.

Once again, we welcome you as you join us as we explore and enjoy our rich natural heritage--the native plants of Minnesota!

Sincerely,

Diane Hilscher,
Minnesota Native Plant Society
Education and Outreach Committee

Orchids from pp. 1

second narrow passage is the exit hole itself. One exit hole is located on either side of the base of the flower. An anther is so positioned beside each exit that a bee of the proper size cannot force its way out without contacting the anther and carrying away a mass of sticky pollen on its back. Since the bee contacts the stigma before the anther and usually does not reverse directions, it does not ordinarily transfer pollen to the stigma of the same flower. Rather, pollination is effected when the bee, upon escaping from the first flower, is subsequently trapped again, usually in a different flower, and the escape procedure is repeated. This strategy is often effective in bringing about cross-fertilization.

Botanists are uncertain just why the bee enters the flower in the first place. In some cases the entry is inadvertent. The bee, exploring the outer surface of the lip, tumbles into the trap. In other cases entry appears quite deliberate. It has been conjectured that small amounts of nectar are present or that the bees feed on the hairs on the inside of the lip. But it now appears likely that the flower provides no food, and the bee is simply deceived by false nectar guides and the odor of the blossom, which promise nectar where none is available. Bees must learn by experience which flowers offer the best reward in nectar (orchid pollen can't usually be deliberately collected by bees because of the anthers' positioning on the flower), and will certainly avoid flowers that offer no reward at all. Lady's-slippers may therefore be dependent upon newly hatched, inexperienced bees for their seed production.

The size of the bee involved in the pollination is, of course, determined by the size of the flower and especially the diameter of the exit holes. Research is still at an early stage, but selected pollinators of some species of lady's-slipper can now be tentatively identified.

The largest exit holes are found in the stemless lady's-slipper (*Cypripedium acaule*), and this species appears to be pollinated by various sorts of bumblebees. This conclusion is based, in part, on observations made in a northern Michigan bog by Warren Stoutamire, University of Akron. Initial attempts to identify the pollinators (by trapping them in aluminum mesh traps as they emerged from the exit holes) were unsuccessful. Yet it was evident that pollination was occurring: the stigmas of numerous flowers were covered with fresh smears of pollen, and the anthers, which face inward toward the exit holes in fresh flowers, had been displaced and forced

outward. A corbicular load from the leg of a large bee was also found in the lip of one flower. An analysis of the pollen in this load revealed tetrads of *Vaccinium* and monads of a rosaceous species, probably *Aronia melanocarpa;* both this species and *Vaccinium corymbosum* were blooming in the area. In addition, large holes had been chewed in the lips of several flowers by visitors that had entered the lip but refused to enter the trap. Finally a bumblebee, *Bombus vagans*, common in the bog, was captured in the lip of one flower. It carried pollen of the stemless lady's-slipper on its thorax from earlier visits to other flowers in the area. Like other bumblebees, it had avoided entering the trap. Observations of the foraging behavior of this bee revealed numerous visits to the flowers of *Vaccinium* and *Aronia*. Subsequent examination of bumblebees in the collection at Michigan State University disclosed the presence of smears of what looked like *Cypripedium* pollen on several specimens of *Bombus borealis*, and further work has identified other bumblebees as pollinators.

However, more extensive studies have demonstrated that these insects visit *C. acaule* infrequently: only about 3-9% of the pollen masses are removed. Artificial pollinations have been found to produce 70-75% fruit-set in selfed and cross-pollinated flowers, respectively; but enclosed, unpollinated flowers do not form capsules. Thus, self-pollination, if it is significant in natural populations, does not appear to occur unless pollinators are present, and development of seed in the absence of fertilization is probably absent. Collectively, these observations suggest that *Cypripedium acaule* is highly fertile but that seed production is limited by the activity of pollinators. A similar pattern is found in other orchids that rely on deception. Relatively few capsules develop, but this deficiency is compensated by the large number of seeds produced in each capsule.

The showy lady's-slipper (*C. reginae*) is the largest of our native orchids, but its exit holes are smaller than those of the stemless lady's-slipper and would probably not allow for the passage of bumblebees. Many floral visitors have been recorded, including butterflies and beetles; but until recently, only a medium sized, black bee, tentatively identified as a species of *Megachile*, had been observed to enter the flower, follow the prescribed course to the base of the slipper, and emerge through the exit hole, removing pollen from the anther. A new study in Vermont, however, has reported over 90% of pollinations to be performed by syrphid flies (*Syrphus torvus*) and a lesser number by flower beetles (*Trichiotinus assimilis*). If confirmed, these results, along with scattered earlier reports of non-hymenopterous pollinators, would require a re-evaluation of the postulated bee-pollination syndrome for all *Cypripedium* species.

At the other extreme, the smallest *Cypripedium* flowers are those of the ram's head lady's-slipper (*C. arietinum*). These have a 1-2 mm opening to the interior of the lip, which is further constricted by long trichomes. The exit holes are also small, about 1 mm wide, and in Ontario the pollinating agents are said to be small bees of genus *Dialictus*. In one study, these bees were observed to land on or near the signal patch, a contrasting white, pubescent area that surrounds the small opening to the interior of the lip. They then entered the lip, where they remained for 1 to 2 minutes, and emerged from the anther opening carrying a pollen deposit on their thorax.

The yellow lady's-slipper (*C. calceolus*) is the most common member of the genus in our area. Solitary bees (*Andrena, Lasioglossum*, and perhaps *Halictus*) act as pollinators in Europe. The flower's scent includes constituents found in the pheromone secretions of *Andrena* species, which may trigger instinctive landing responses. In our area a variety of bees have been collected in the flowers. One, *Ceratina calcarata*, has been reported to transport pollen among flowers of variety pubescens in Michigan, and visits by other species of *Ceratina* have been observed elsewhere in North America. The 2 mm exit holes in this variety could just accommodate these small bees.

Two local varieties of yellow lady's-slipper differ in their habitat preferences. One is more

common on lower wetter sites, the other, on dryer upland sites. This distribution may correspond with the nesting and foraging habitats of different, ecologically restricted species of bees, and a divergence in floral morphology in these varieties may reflect an ongoing adaptation to different pollinating agents. It has been conjectured that populations of this orchid were separated during the Pleistocene glaciation. Isolation and exposure to different groups of pollinators during this period may have led to edaphic and floral specializations, which following the retreat of the ice, plant migration, and limited introgression have produced the variation pattern currently observed in this species.

The only published study of pollination in the small white lady's-slipper (*C. candidum*) indicates that halictine and andrenid bees, 6-7 mm long, may be the principal pollinators of this species in southern Ontario. These bees were observed carrying pollen smears of *C. candidum* on their dorsal thorax and are said to be well suited, both in terms of size and seasonal abundance, to the pollination of this orchid.

It is evident from the often circumstantial and largely anecdotal evidence available that additional, systematic studies of pollination are needed in *Cypripedium*. Pollination studies in orchids, in general, are of particular interest because orchid flowers and their pollinators provide numerous examples of highly specialized relationships. Orchids are often fertile across species and even generic boundaries, and selection for intraspecific pollination has led to the co-evolutionary development of novel floral morphologies and the correspondingly specialized behaviors needed by pollinators to exploit them. The more spectacular and most frequently cited cases are usually drawn from exotic and often tropical orchids, but many interesting examples also occur among Minnesota species, especially in the more advanced orchid groups. Some of these may be examined in future issues.

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Guidelines for Planting Your Own Prairie

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The following instructions will help you establish a native prairie landscape. By following these recommendations you can successfully establish populations of prairie grass and wildflowers that will compliment your traditional landscape and add a touch of Minnesota's natural heritage to your life.

1. Site Selection: Prairies thrive in sun and do best in open spaces. When selecting your site look for areas with maximum sun exposure and lack of competition from trees. Elm, Basswood and Maples are especially bad because of their high surface root density.

Also, remember that prairies are quite combustible during times of dry weather. Consequently they should not be planted near structures that may ignite easily. Allow approximately 20 feet of traditional sod or non-combustible surface between your prairie and buildings.

2. Seeding Dates: Optimum - May 20th to June 20th. Range - May 1st to August 10th and September 20th to freeze-up.

3. Seed Bed Preparation: The primary objective is to clear the site of existing vegetation. Make sure the seed bed consists of freshly worked, open soil. Seed broadcast into existing vegetation has little chance of success. If vegetation does exist it should be sprayed with a Glyphosate herbicide such as Roundup or Ranger following all label directions. Tilling, raking, seeding and re-raking should follow. On sites with open soil the tilling can be eliminated but the raking, seeding and re-raking must still be done.

4. Seeding: Seed can be hand broadcast or applied with certain spreaders. The most important thing is to get an even distribution of seed and to establish seed to soil contact. The seed must be in contact with the soil to achieve maximum results.

When hand broadcasting, try to seed slowly and cover each area in two directions. Flower seed can be concentrated in high priority areas or spread throughout the site. Much of this seed is small and should be spread thinly to achieve best results. One pound of grass seed covers approximately 2000 square feet. Flower seed rates vary, 2 ounces per 1000 square feet should give you a colorful prairie. Follow all seeding with another light raking. Watering is helpful and it is best not to fertilize!

5. Management: Prairie takes time to develop, requiring patience and management during the first year or two. However, if you have executed the previous steps properly and follow these management guidelines, your prairie seedlings will eventually mature and create a unique natural landscape. Management procedures can be planned on a yearly basis as follows.

- Year one - During the first growing season you should cut the planting 2, 3 or even 4 times. This is generally done on 30 day intervals using a scythe, mower or line trimmer. Scything is often best as the cutting height should be kept between 5 and 8 inches. If a mower is used, set it as high as possible. Hand weeding can be done during the first growing season. Individual noxious weeds or invading woody plants should be removed.

- Year two - During the second year one mowing is occasionally done between mid- June and mid-August. Weed control and height regulation should help you decide if and when.

- Year three - By the third year (and in years to follow) your patience will really begin to pay off. Both grasses and flowers will be mature, providing low maintenance and good aesthetic returns. One cutting can be done each year as a clean-up procedure. This is best done late (November) or early (May). Burning is a possible alternative but be certain to get permits and use caution.

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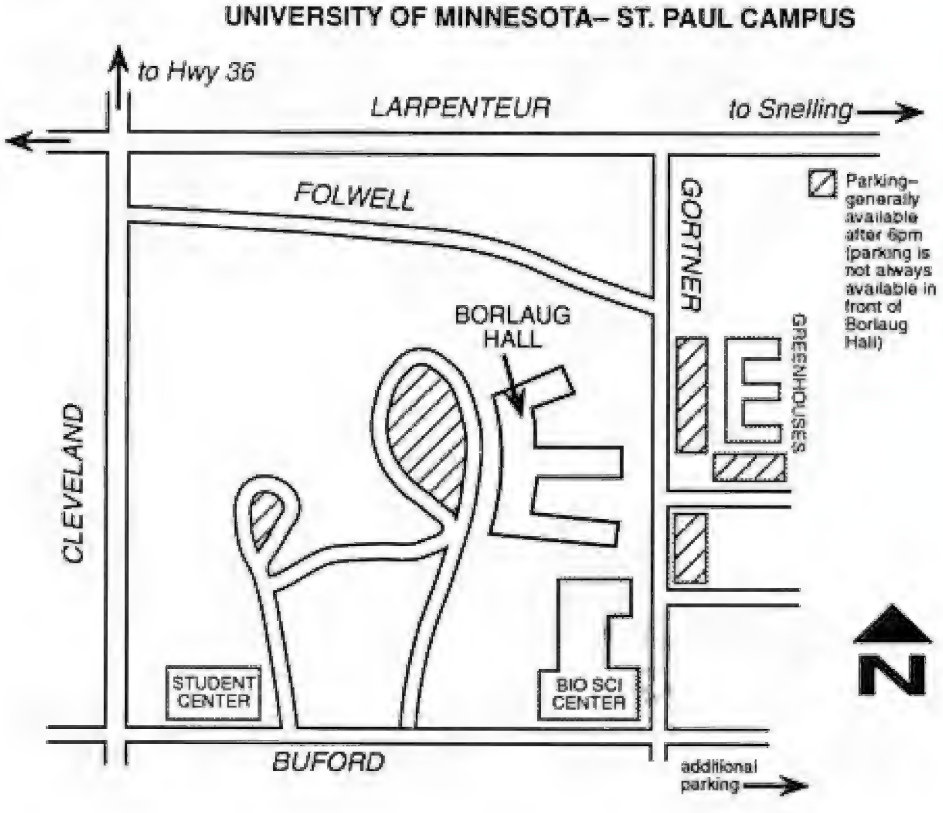

Minnesota Plant Press

Vol. 12:3 Newsletter Of The Minnesota Native Plant Society, Spring 1993

The Minnesota Native Plant Society holds monthly meetings from October through May, on the first Wednesday of each month, unless noted through special mailing. Meetings are held in room 335 Borlaug Hall, St. Paul campus U of M. Meeting are 7:30 - 9:00 PM.

Long-Range Planning for Minnesota Wildflower Gardens

May Wright

You have probably seen or heard about computer programs that can show you a landscape plan and then show you what it will look like ten years hence. It can be done quite accurately because of the general knowledge of cultivated species. It entails information on how fast the tree species grow and how fast the undergrowth plants spread and reproduce.

With native wildflowers however, this information is not as readily available. The following are a few observations about Minnesota wildflowers that may be helpful.

For a home garden to continue to be attractive over several years and yet not demand excessive care the species should be chosen carefully. What is needed are ones that are adapted, attractive, long-lived, and that increase, but not so rapidly that others can not co-exist. Yearly fluctuations occur but over several years these comparatively-rapid spreaders can be recognized. They may be used to good advantage in difficult or confined spaces as individual ground covers. In nature, or in restorations where areas are large, rapidity of growth is not as much of a problem.

In the deciduous woodland garden, be careful about introducing the following:

- Wild Ginger, *Asarum canadense*. This covers an area very quickly. Better as a ground cover.
- Virginia Waterleaf, *Hydrophyllum canadense*. Increases rapidly and forms such a compact mat that it is hard to eliminate.
- Baneberries, *Actaea rubra and A. pachypoda*. Multiply readily and overshadow others. Better by themselves.

Wildflowers continued on pp. 2.

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Announcements

- **Tales of the Tall Grass II** - The International Prairie Tour of the Lower Red River Valley of the North (North Dakota, Minnisota & Manitoba). August 13, 14 & 15. Each state or province will host one day of tour activities that will include prairie visits, programs and presentations on a variety of prairie-related subjects, bar-b-ques, and evening entertainment. For registration materials contact Garry Barvels, Lake Bronson State Park, Box 9 - Lake Bronson, MN 56734, 218-754-2200.

- **City of Maplewood Natural History Seminar Series** - Welby Smith, DNR Botanist, will show slides of orchids from his upcoming book at Maplewood Nature Center Monday June 28 at 7:00 PM. He will teach you how to identify orchids and share their unique natural history.

His lecture is part of a series of Natural History Seminars offered by Maplewood Nature Center beginning on June 14. Call 738-9383 for more information.

Wildflowers from pp. 1

- Violets, *Viola* sp. Everyone loves them but they can become a nuisance unless confined in some manner.
- Mayapple, *Podophyllum peltatum*. Requires quite a bit of space as these large-leafed plants spread in yearly-widening circles.

Which ones then will do well over several years? There are many. Here are a few to start with, listed in order of bloom:

- Hepaticas, *Hepatica acutiloba* and *H. Americana*
- Bloodroot, *Sanguinaria canadense*
- Dutchman's breeches, *Dicentra cucullaria*
- Early Meadow-rue, *Thalictrum dioicum*
- Rue-Anemone, *Anemonella thalictroides*
- Large-flowered Trillium, *Trillium grandiflorum*
- Bellwort, *Uvularia grandiflora*
- Rosy Twisted-stalk, *Streptopus roseus*

In the north-woods garden, the acid condition does not support very rapid growth, so competition is not much of a consideration.

- Wild Lily-of-the-valley, *Maianthemun canadense*. This does better as a ground cover than among other plants.

Some species that live together well in a north-woods garden:

- Bluebead Lily, *Clintonia borealis*
- Starflower, *Trientalis borealis*
- Wood sorrel, *Oxalis montana*
- Partridge-berry, *Mitchella repens*

- Pink Pyrola, *Pyrola asarifolia*
- Wintergreen, *Gaultheria procumbens*

While planning for a moist or mesic prairie or meadow garden, be aware that conditions there are conducive to the rapid spread of some forbs. These can limit diversity.

- Canada Anemone, *Anemone canadensis*
- Fringed Loosestrife, *Lysimachia ciliata*
- Common Milkweed, *Asclepias syriaca*
- Wild Golden Glow, *Rudbeckia laciniata*
- Blue Vervain, *Verbena hastata*
- Many Sunflowers, *Helianthus* sp.
- Many Goldenrods, *Solidago* sp.
- Many Asters, *Aster* sp.

Species that are compatible in the mesic prairie garden:

- Prairie Smoke, *Geum triflorum*
- Shooting Star, *Dodecatheon meadia*
- Prairie Violet, *Viola pedatifida*
- Wood Lily, *Lilium philadelphicum*
- Great Blue Lobelia, *Lobelia siphilitica*
- Prairie Blazing Star, *Liatris pycnostachya*
- Culver's Root, *Veronicastrum virginicum*
- Bottle Gentian, *Gentiana andrewsii*

Some of those noted as aggressive in the mesic prairie garden can be troublesome in the dry prairie garden. Usually, though, the low moisture condition, due to rapid drainage, limits growth. The following will grow in a dry prairie garden:

- Pasque-flower, *Pulsatilla nuttaliana (Anemone patens)*
- Violet Wood-sorrel, *Oxalis violacea*
- Prairie Phlox, *Phlox pilosa*
- Birdsfoot Violet, *Viola pedata*
- Lupine *Lupinus perennis*
- Button Blazing Star, *Liatris aspera*
- Wild Bergamot, *Monarda fistulosa*
- Pale Purple Coneflower, *Echinacea angustifolia*

Even without a computer's help, you can plan before planting. Be wary of plants labeled "easy to grow." Some catalogs give a truer description by labeling them "aggressive."

Saving Vermont's Wild Orchids: Dr. William Ballard Fights For a Beautiful World

Nancy Freiberg

One simply is not prepared for the alien beauty of the showy lady's slipper. Each orchid, huddling with its neighbors, rises from large almond-shaped leaves. The brilliant white and soft pink pouch of the slipper bulges like a girl's puffed sleeve between two petals that look like hummingbird wings. One can imagine that some tiny creature has gently blown air into it or that the wings take flight when no one is looking.

More than 50 years ago, lady's-slippers graced many of Vermont's wetlands. Now the most popular of the northern terrestrial orchids is a rarity, and substantially fewer Vermonters are lucky enough to come across them. Although their special requirements are part of the problem, illegal collection and destruction of natural habitat probably account for most of the decline.

There is perhaps no one else in Vermont who has been affected more deeply by this decline than William Ballard. Now 85 and a professor emeritus of biology at Dartmouth College, Ballard's concern for the orchids goes back more than 70 years to when he first delighted in the sight of one as a boy in western Massachusetts. Remembering how prevalent they were, he has devoted the past two decades to increasing their numbers in Vermont.

"This world was made beautiful," he says. "It is being made less beautiful by people who don't understand the importance of beauty."

One of Ballard's first acts in support of the lady's-slipper was to convince Dartmouth to purchase a botanically rich swamp that biology students had visited since the 1800s. Having graduated form the college in 1928 Ballard knew lady's-slippers had once flourished there.

"I began to think about getting them back in the college bog," says Ballard, who has lived in Norwich, across the Connecticut River from Dartmouth, since 1939. "I began scattering millions of seeds there, and then I never could get out of the business. Too much fun."

Dedication and systematic research have made Bill Ballard a pioneer in the propagation of the lady's slipper.

What began as a kind of hobby for Ballard has grown into a systematic research project. In spite of the fact that many scientists had attempted to germinate lady's-slipper seeds in the lab without much success, Ballard was able to develop a growth medium that results in an 80 to 95 percent germination rate. He also found that the show lady's-slipper seeds need to be refrigerated for at least two months before germination can occur. To assure that he has plenty of seeds, ballard spends each spring hand-pollinating every wild blossom he can find.

Finding himself with an abundance of lady's-slipper embryos, he says the challenge now lies in getting them to grow optimally and survive the transfer form sterile culture to the moist conditions of their natural habitat.

"About a dozen investigators are working at this frontier," says Ballard. "But much has still to be learned before they can be grown as a crop, putting out of business those who dig up and sell the wild plants."

The Nature Conservancy thinks Ballard is a treasure. "He has, no question, pioneered in an area that few people have had the patience and wherewithal to explore--how these orchids reproduce," says Marc DesMeules of the Nature Conservancy's Montpelier office. "He's a very unique person in that he's doing this because he's interested in it, not for any fame or glory."

Trained in the study of fish embryology, Ballard gave up that research about 15 years ago because carrying the required equipment and setting it up in foreign lands became too difficult for him.

Exploring the embryology of the orchids, however, was something he could do at home. Friends showed him stands of the four local species and he began to pollinate them, scattering seed in hopes of increasing their numbers. After seeing no results for several years, he turned to the laboratory to explore the orchids' requirements.

Much later Ballard found that some of his early scatterings had succeeded. Years after sowing pink lady's-slippers in the woods behind his home, for example, the first flower appeared.

He sowed hundreds of thousands of showy lady's-slipper seeds in a Norwich swamp that now contains more than two dozen clumps of the species. Through the efforts of Ballard and others, the owner of the swamp made a gift of the property to the town of Norwich. Now a trail and a boardwalk have been established to protect the plants and allow people to visit in the blossoming season.

There are four types of lady's-slippers in Vermont--the showy (often thought of as the most beautiful), the pink, the yellow and the ram's-head (the rarest of the bunch).

The yellows and showys appear in June and are in bloom for only nine precious days. This brief blooming period can be appreciated even more in light of how long it takes for them to get to this point. The orchids are teenagers before their first bloom, and their chances of surviving childhood are something like the infant mortality rate during times of plague.

A lady's-slipper seed takes five weeks to germinate and then spends two or three years underground, depending for survival on a symbiotic relationship with a primitive fungus. The fungus brings nutrients to the underground seed, which still lacks the root hairs to do the job itself. What the seed does for the fungus is a mystery; some speculate certain vitamins are transported this way.

An unfortunate aspect of this relationship is that the fungus tends to make the seeds rot. Even if the orchid survives this stage of growth, it faces more than a decade of combating such problems as too much sun or too little sun or not enough humidity. Lady's-slippers are picky.

"This world was made beautiful," says Ballard. "It is being made less beautiful by people who don't understand the importance of beauty." At home in Norwich, right, he is surrounded by plants.

In the laboratory at Dartmouth where he still works five to six days a week, Ballard has hundreds of vials with seeds floating in a sterile medium. He has found, after such trial and error, that the sterile medium is actually capable (in the case of the showys) of replacing the function of the fungus. Once the orchids produce their first green leaf, Ballard transports them to artificial bogs behind his house.

The process involves an elaborate schedule. The seeds are put in the sterile medium in September. In February, Ballard takes the embryos out (one vial may contain 200) and separates them by fives into vials. Several months later, each embryo is transferred to a larger test tube.

"He didn't take the short cut," notes DesMeules. "He took the long road. A lot of people just deal with the flowers that are easy to propagate. He did it the hard way and he succeeded."

A grant from the American Orchid Society three years ago, which Ballard says he is still "nibbling on," allows him to continue experiment with nutrients, humidity, light and temperature to find ways of satisfying the requirements of the four species.

Ballard cultivates all of them at his home in Norwich, where he has carefully created artificial bogs. These consist of sunken wooden frames lined with plastic and filled with soil. The plastic retains water, creating a swamp-like environment.

Tenderly handling a leaf, Ballard will kneel down to show you a swelling ovary on a ram's-head, or explain his system of distinguishing hybrids from self-pollinating plants in his original clump of yellow lady's-slippers, placed there more than 40 years ago.

"I have all six possible hybrid combinations of three of the four local species," he explains. "They are still in sterile medium. The question is whether I will live long enough to see them blossom." Ballard could be in his late 90s before the orchids flower.

Using a toothpick and magnifying glasses, he regularly pollinates lady's-slippers in damp Vermont woods. Later, in the fall, he takes just enough seed for his research, scattering the rest in hopes of spreading the orchids to new territory. The microscopic seeds, he explains, are very widely distributed by the wind, but most settle on unfavorable ground. Some travel as much as 1,000 miles. Each blossom may produce as many as 50,000 seeds.

Yet only about eight percent of the orchids are pollinated if left to their own devices. Performing the job by hand brings pollination up to 90 percent, Ballard says. The process is difficult because the orchid is so highly evolved that it needs a specific type of insect to pollinate it. The insect, attracted by the color of the orchid and looking for nectar (non-existent in the lady's-slipper), gets pollen on its back while making its fruitless investigation. When the insect enters another flower, pollen comes in contact with the stigma and fertilization takes place. The orchids' lack of nectar may account for its low natural rate of pollination, since even insects eventually learn that the flower has nothing to offer them.

The insect also may not happen to frequent an area where the orchids grow or the orchid stands may be so far apart that pollination never takes place.

The orchids on which Ballard has spent so much time and energy are among the oldest of the flowering plants, and thus have learned all the evolutionary "tricks" in the book, he says. But that does not keep them from being endangered. "There are advantages and disadvantages to any scheme," he notes of the orchid's life cycle.

Ballard's desire to protect and conserve nature is not limited to orchids. He is breeding tadpoles in a former septic tank, raising rare salamanders in his kitchen and will causally tell you that the rare Hart's-tongue fern on the windowsill was "brought wrapped in dirty laundry from France." Scientists and other orchid-lovers send him seeds from all over the world. An acquaintance in the state of Washington is providing him with seeds of the Calypso orchid, a flower Robert Frost immortalized in a poem called "The Encounter." Although the orchid is nearly extinct in Vermont, Ballard has been able to raise a few embryos from the seeds and is cooperating with the Nature Conservancy to maintain the species here.

With all this activity, the retired professor still finds time for a large vegetable garden, takes care of his crippled wife, Elizabeth, and goes on frequent hikes. He celebrated his 80th birthday by climbing Mount Washington.

Ballard often wears out his younger companions when leading people to the lady's-slippers in the Norwich bog.

A distinguished-looking man, in spite of the red high-top sneakers and red handkerchief he wears on such hikes, Ballard bounds ahead on these jaunts like a man 50 years his junior.

"We purposefully make this trail full of curves so if people try to find it they would get lost," he explains, picking up stray branches to clear the trail as he goes. In the half-mile to the lady's-slippers, he has gently informed his small group about the effects of the 1938 hurricane and the possibility of a scarlet tanager nearby. "Sounds like a robin with a horrid cold," he

notes. Finally he leads the last part of the trail on skinny wooden planks, dodging mosquitos, to the clumps of showy, bright visions in the murky bog. "Oh, Bill!" exclaims one of the group when she first sees the flowers. "They're beautiful!" Because underground rhizomes travel and send up new shoots, the clumps get larger every year.

Ballard's mother, a schoolteacher, interested him in wildflowers and ferns decades ago to fill the void left because there was no one his age in their French-Canadian village who spoke English. now it is Ballard who gently passes on his knowledge.

He hopes to see his work carried on and says he knows "half a dozen" people who want to get involved. He hopes that someone--or better yet a number of people--will take over his projects.

"We've got to do something to take the hardship of these disappearing species and keep them going," he says. "The more species we lose, the poorer the planet."

Freelance writer Nancy Freiberg lives in Elmore, Vermont

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